

Claims

What is claimed is:

1. A home network, comprising:
  - a network backbone;
  - a plurality of modules connected to the network backbone, each module being connected between the network backbone and a local bus; and
  - a demarcation point unit receiving a home network signal from one of the modules over the network backbone and passing the home network signal to the plurality of modules.
2. The home network of claim 1 wherein the network backbone includes a plurality of coaxial cables.
3. The home network of claim 2 wherein the coax cables are part of pre-existing cable equipment installed in a home in which the home network resides.
4. The home network of claim 1 wherein the network backbone includes at least one splitter.
5. The home network of claim 1 wherein one module is in communication with a plurality of local buses.
6. The home network of claim 5 wherein one of the local buses is a 1394 local bus and another of the local buses is one of a universal serial bus (USB), Ethernet bus, and a Internet Protocol (IP) bus.
7. The home network of claim 5 wherein at least two of the modules are in communication with 1394 local buses.

- 1 8. The home network of claim 5 wherein at least two of the modules are in communication  
2 with USB local buses.
- 1 9. The home network of claim 5 wherein at least two of the modules are in communication  
2 with Ethernet local buses.
- 1 10. The home network of claim 1 wherein the demarcation point unit is connected to an  
2 external network, the demarcation point unit receiving an external signal from the  
3 external network and passing the CaTV and the home network signals together over the  
4 network backbone.
- 1 11. The home network of claim 10, wherein the external signal is a cable TV (CaTV) signal.  
2
- 1 12. The home network of claim 10, wherein the external signal is a satellite signal.  
2
- 1 13. The home network of claim 10 further comprising an electronic device connected to the  
2 demarcation point unit to receive the external signal.
- 1 14. The home network of claim 10, wherein at least one of the modules is integrated into a  
2 cable TV device.
- 1 15. The home network of claim 14, wherein the cable TV device is a cable modem and the  
2 external signal is a cable modem signal.
- 1 16. The home network of claim 15, wherein the cable TV device is a set top box.
- 1 17. The home network of claim 10 wherein at least one of the modules is integrated into a  
2 computer.
- 1 18. The home network of claim 11, wherein a frequency of the home network signal is above  
2 a frequency of the external signal.
- 1 19. The home network of claim 18, wherein the frequency of the home network signal is  
2 higher than approximately 2100 MHz.

1 20. The home network of claim 18, wherein the frequency is of the home network signal is  
2 less than approximately 1050 MHz.

1 21. The home network of claim 20, wherein the network backbone includes a splitter having  
2 an operational range of less than 900 MHz.

1 22. The home network of claim 1, wherein the demarcation point unit includes a signal  
2 reflector unit that receives the home network signal having a first frequency and passes to  
3 the plurality of modules the home network signal having a second frequency.

1 23. The home network of claim 22, wherein the first frequency is the same as the second  
2 frequency.

1 24. The home network of claim 22 wherein the second frequency is different than the first  
2 frequency.

1 25. The home network of claim 1, wherein the network backbone conveys communications  
2 between the modules at approximately 100 Mbps.

1 26. A home network comprising:

2 a demarcation point unit receiving a signal from a network that is external to the  
3 home;

4 a plurality of modules each connected to the demarcation point unit by one or  
5 more coax cables and to a device by a local bus, one of the modules receiving a message  
6 from the device connected to that one module by the corresponding local bus and  
7 transmitting the message to the demarcation point unit;

8 wherein the demarcation point unit receives the message from that one module  
9 and transmits the message and the signal together to each of the plurality of modules over  
10 the coax cables.

- 1 27. A demarcation point unit connected between a home network backbone and an external  
2 network, the demarcation point unit comprising:  
3 a diplexer receiving a home network signal from the home network backbone and  
4 an external signal from the external network, the diplexer separating the home network  
5 signal from the external signal; and  
6 a signal reflector unit receiving the home network signal from the diplexer and  
7 returning the home network signal back to the home network backbone.
- 1 28. The demarcation point unit of claim 27 wherein the signal reflector unit is an output of  
2 the diplexer that reflects the home network signal back to the home network backbone.
- 1 29. The demarcation point unit of claim 28 wherein the output of the diplexer is shorted to  
2 ground.
- 1 30. The demarcation point unit of claim 28 wherein the output of the diplexer is  
2 unterminated.
- 1 31. The demarcation point unit of claim 27 wherein the signal reflector unit includes a given  
2 coax cable connected to an output of the diplexer, the given coax cable reflecting the  
3 home network signal back to the home network backbone.
- 1 32. The demarcation point unit of claim 28 wherein one end of the given coax cable is  
2 shorted to ground.
- 1 33. The demarcation point unit of claim 25 wherein one end of the given coax cable is  
2 unterminated.
- 1 34. The demarcation point unit of claim 27 wherein the signal reflector unit includes a delay  
2 line in communication with the diplexer.

- 1 35. The demarcation point unit of claim 34 wherein one end of the delay line of the signal  
2 reflector unit is shorted to ground.
- 1 36. The demarcation point unit of claim 34 wherein one end of the delay line of the signal  
2 reflector unit is unterminated.
- 3 37. The demarcation point unit of claim 27 wherein the signal converter unit includes a RF  
4 converter that changes a frequency of the home network signal before the home network  
5 signal returns to the home network backbone.
- 1 38. The demarcation point unit of claim 37 wherein the home network signal passing to the  
2 diplexer from the home network backbone is an upstream signal, the home network  
3 signal returning to the home network backbone from the signal reflector unit is a  
4 downstream signal, and the diplexer is a first diplexer, and  
5 wherein the signal reflector unit includes a second diplexer having an input/output  
6 (I/O) in communication with the first diplexer and an input in communication with the  
7 RF converter, the second diplexer separating the upstream signal received by the I/O  
8 from the downstream signal received by the input.
- 1 39. The demarcation point unit of claim 38 wherein the second diplexer returns the  
2 downstream signal to the first diplexer over the I/O.
- 1 40. The demarcation point unit of claim 38 further comprising an output in communication  
2 with the RF converter, and wherein the second diplexer passes the upstream signal to the  
3 RF converter over the output.
- 1 41. The demarcation point unit of claim 37 wherein the RF converter includes a RF down-  
2 converter in communication with a RF up-converter, the RF down-converter changing the

frequency of the upstream signal to an intermediate frequency and the RF up-converter changing the intermediate frequency to the frequency of the downstream signal.

42. The demarcation point unit of claim 38 wherein the frequency of the upstream signal is higher than the frequency of the home network signal.

43. The demarcation point unit of claim 38 wherein a power level of the upstream signal received at the signal reflector unit is constant.

44. The demarcation point unit of claim 38 wherein a power level of the downstream signal leaving the signal reflector unit is constant.

45. The demarcation point unit of claim 38 wherein home network signal passing to the diplexer from the home network backbone is an upstream signal, and the home network signal returning to the diplexer from the signal reflector unit is a downstream signal, and further comprising a splitter connected between the diplexer and the home network backbone, the splitter receiving the downstream signal from the diplexer and passing the returned downstream signal to the home network backbone over a plurality of coax cables.

46. The demarcation point unit of claim 45 wherein the splitter receives the upstream signal from the home network backbone for transmission to the diplexer.

47. The demarcation point unit of claim 27, wherein the diplexer combines the home network signal received from the signal reflector unit with the external signal received from the external network and transmits the combined signal to the home network backbone.

48. A network module connected between a network backbone and a local bus, comprising:  
a diplexer receiving from the network backbone an analog signal and separating a home network signal from the analog signal;

4 a modem converting the home network signal to a digital signal;  
5 a media access controller (MAC) controlling communications of the network  
6 module with other modules connected to the network backbone; and  
7 a switching fabric interfacing with a protocol of the local bus to deliver the digital  
8 signal to the local bus.

1 49. The home network module of claim 48, further comprising a transmission power  
2 controller controlling a power level of the home network signal.

1 50. In a home network having a plurality of network modules connected to a coax backbone,  
2 a method for communicating over the coax backbone between network modules, the  
3 method comprising;

4 transmitting a cycle start burst over the backbone to start a transmission cycle  
5 during which the network modules transmit bursts over the backbone;

6 allocating a first portion of the transmission cycle for the transmission of  
7 isochronous bursts by the network modules; and

8 allocating a second portion the transmission cycle for the transmission of  
9 asynchronous bursts by the network modules.

1 51. The method of claim 50 further comprising establishing a transmission order for the  
2 network modules to follow when transmitting isochronous bursts over the backbone.

1 52. The method of claim 51 wherein the cycle start burst includes the transmission order.

1 53. The method of claim 50 further comprising establishing a transmission order for the  
2 network modules to follow when transmitting asynchronous bursts over the backbone.

1 54. The method of claim 53 wherein the cycle start burst includes the transmission order.

- 1 55. The method of claim 50 further comprising determining that the transmission cycle has  
2 ended and allowing transmission of an asynchronous burst to complete after the end of  
3 the transmission cycle.
- 1 56. The method of claim 50 further comprising determining those network modules that are  
2 requesting bandwidth for transmitting isochronous bursts.
- 1 57. The method of claim 50 further comprising designating one of the modules to be a master  
2 network module, and wherein the master module transmits the cycle start burst.
- 1 58. The method of claim 50 further comprising synchronizing the network modules to the  
2 cycle start burst.
- 1 59. The method of claim 50 further comprising transmitting a registration start burst.
- 1 60. The method of claim 50 further comprising allocating bandwidth in the first portion of  
2 the transmission cycle to each network module requesting a guaranteed quality of service.
- 1 61. The method of claim 50 further comprising monitoring, by a given network module,  
2 asynchronous bursts on the backbone to determine when the given network module can  
3 transmit an asynchronous burst.
- 1 62. The method of claim 50 further comprising receiving, by a given network module, a grant  
2 signal over the backbone to indicate that the given network module can transmit an  
3 asynchronous burst.
- 1 63. The method of claim 50 further comprising monitoring, by a given network module,  
2 isochronous bursts on the backbone to determine when that network module can transmit  
3 an isochronous burst.



64. The method of claim 50 further comprising transmitting, by a given network module, an empty burst if the given network module has no data to transmit during the second portion of the transmission cycle.

65. The method of claim 50 further comprising transmitting, by a given network module, a self-train burst.

66. In a home network having a plurality of 1394 buses each connected to a network backbone by a network module, the network backbone including a plurality of coax cables, each network module providing a bridge between the network backbone and the 1394 bus connected to that network module, the bridge comprising:

a 1394 Phy layer; and

a 1394.1 link layer routing communications among the plurality of 1394 buses over the coax cables of the network backbone.

67. The bridge of claim 66 wherein the 1394 Phy layer is modified to enable an emulation of the plurality of 1394 buses in the home network as a single 1394 bus.

68. In a home network having a plurality of network modules connected to a network backbone, the network modules communicating with each other over the network backbone using bursts having a plurality of burst types, a burst comprising:

a preamble signifying a start of the burst and the type of the burst;

a header providing at least one parameter for decoding the burst; and

a data portion carrying QAM (quadrature amplitude modulation) symbol data.

69. The burst of claim 68 wherein the preamble includes a periodic preamble portion having a length, the length of the periodic preamble determining the type of the burst.

- 1 70. The burst of claim 68 wherein the preamble includes a periodic preamble portion having
- 2 symbols that periodically alternate in sign, wherein the alternating symbols determine the
- 3 type of the burst.